REMARKS/ARGUMENTS

Favorable reconsideration of this application as currently amended and in view of the following remarks is respectfully requested.

Claims 1-23 and 26-30 are currently active in this case. Claim 26 has been amended, and claims 24 and 25 have been canceled by the current amendment. No new matter has been added.

In the outstanding Office Action, claim 11 was objected to; claim 26 was rejected under 35 U.S.C. § 112, second paragraph, for being indefinite; claims 1-3, 5, 6, 12-17, 20-23, and 26-30 were rejected on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 1-3, 9, 10, 12, 16, 19, 27, 31, 32, and 38-40 of U.S. Patent No. 6,979,292; claims 1-23, 29, and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kruger publication; claims 26 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kruger publication in view of U. S. Patent No. 6,049,728 to Chou; and claim 27 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kruger publication in view of Chou and U. S. Patent Application Publication No. 2003/0097049 to Diab et al.

In response to the objection to claim 11, the status identifier of claim 11 has been changed as recommended in the Office Action. No further objection to claim 11 is therefore anticipated.

In response to the rejection of claim 26 under 35 U.S.C. § 112, second paragraph, that claim has been amended as recommended in the Office Action. Consequently, no further rejection under 35 U.S.C. § 112, second paragraph, is anticipated.

Applicants inadvertently failed to file a Terminal Disclaimer with the August 1, 2007 amendment. A Terminal Disclaimer has been filed herewith in order to overcome the

outstanding obviousness-type double patenting rejection. No further double patenting rejection is therefore anticipated.

The present invention (claim 1) is directed to a non-invasive imaging apparatus including a light irradiation unit configured to irradiate light generated by a light generating unit into a subject to be examined; a waveguide including a plurality of optical fibers, and configured to guide the light generated by the light generating unit to the irradiation unit; and a plurality of two-dimensionally arrayed electroacoustic transducer elements configured to convert acoustic waves from the subject into electrical signals. The plurality of electroacoustic transducer elements are vertically and horizontally arrayed with predetermined gaps provided therebetween, and the plurality of optical fibers are arranged in the gaps.

As a consequence of this configuration, volume data corresponding to a three-dimensional region representing a living body function can be acquired by a two-dimensional electroacoustic scanning process based on light irradiation from the irradiation unit and detection of the resultant acoustic waves generated by the electroacoustic conversion unit. See the Specification page 16 lines 1-11.

Similarly, claim 21 defines a plurality of two-dimensionally arranged electroacoustic transducer elements with predetermined gaps provided therebetween, and irradiation means arranged in the gaps. Claim 29 is directed to an apparatus for imaging tissue such as breast cancer in humans and defines the same configuration of the electroacoustic transducer elements and the plurality of optical fibers defined by claim 1. Similarly, claim 30 is directed to an apparatus for determining a distribution of the concentration of an analyte and also defines the configuration of the electroacoustic transducer elements relative to the plurality of optical fibers defined by claim 1.

Claims 16 and 26 define an imaging method including, among other steps, the steps of (claim 16) irradiating a subject to be examined with light containing a specific wavelength component using a plurality of optical fibers having two-dimensionally arranged light irradiation positions; and receiving, using a plurality of two-dimensionally arranged electroacoustic transducer elements integrated with the plurality of optical fibers, acoustic waves generated in the subject upon the irradiation of light. Claim 26 defines, among other steps, the steps of bringing a diagnostic probe including two-dimensionally arrayed ultrasound imaging elements and photoacoustic irradiation and detection elements integrated with the imaging elements into contact with breast tissue.

The Official Action asserts on page 6 that it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the invention of Kruger to use optical fiber as the waveguide means. Applicants respectfully traverse for the reasons provided below. Additionally, the Official Action concedes that Kruger does not explicitly disclose a plurality of waveguides in the handheld unit. Applicants agree. However, the Official Action further asserts that (a) it would have been obvious to a person having ordinary skill in the art at the time of the invention to use a plurality of waveguides between the detector elements (presumably with regard to the embodiment of Fig. 3), and (b) that the exact number of elements surrounding the waveguide is an obvious design choice. Applicants again respectfully traverse.

Kruger discloses an electromagnetic radiation system including a tank 12 having a plurality of waveguides 18 positioned around a circumference of the tank 12. As conceded in the Office Action, the waveguides 18 do not include a plurality of optical fibers. A detector 24 includes a plurality of piezoelectric acoustic sensors and is designed to rotate around the tank 12 to correspond with the location of the various waveguides 18.

The detector 24 is not integrated with any of the waveguides 18. That is, as can be seen from Figure 2 of Kruger, no gaps are provided between the array elements of detector 24 such that optical fibers functioning as waveguides can be provided within those gaps. Any gaps illustrated in Figure 3 appear to be a function of the shape of the tank. There is no teaching or suggestion what is between the flat faced arrays which would allow for placement of fiber optics. Further, there is no teaching how fiber optics could be integrated wihin the sub-array. Consequently, Kruger fails to teach a configuration where a waveguide including a plurality of optical fibers forming a part of a light irradiation unit is *integrated* with electroacoustic transducer elements. It would not have been obvious to a person having ordinary skill in the art at the time of the invention to provide the waveguides 18 integrated within the detector 24 of Kruger because the purpose of Kruger was to provide a detector 24 which is rotatable to a plurality of positions relative to the various waveguides. See para. [0031] of Kruger.

The handheld embodiment illustrated in Figure 7 only has a single waveguide 84 and a plurality of sensors. Kruger does not teach or suggest using a handheld device with multiple waveguides. Kruger also does not include a teaching or suggestion beyond the embodiment of Figure 3 which uses multiple waveguides, and that embodiment lacks the integrated optical fiber feature of the present invention.

For the foregoing reasons, Kruger is not believed to anticipate or render obvious the subject matter defined by the present invention. Dependent claims 2-15, 17-20, 22, 23, 27, and 28 are believed to be allowable for at least the same reasons that the respective independent claims are believed to be allowable.

In view of the foregoing no further issues are believed to remain. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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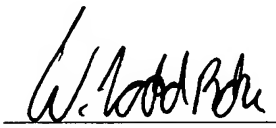

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